Space Weather Forecast

Issued on Saturday 22 March 2025 at 13:27 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Chance of Minor-Moderate Radio blackouts. Minor to Moderate Geomagnetic storms possible each day. Chance of Strong Geomagnetic storm days 1 and 2 (22/23 Mar).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity reached Moderate levels following an isolated Moderate-class flare at 21/1558UTC, from AR4028 in the southwest. There are currently fourteen sunspots on the Earth facing disc, twelve numbered and two un-numbered. Despite the large amount of sunspots, the vast majority are relatively small and magnetically simple and either stable or in slight decay. AR4036, near the meridian in the northwestern quadrant, is now the most significant group having displayed quite rapid growth in the past 24 hours. AR4026, AR4033 have faded to plage, with two simple new regions appearing in the eastern hemisphere near the limb.

A faint halo coronal mass ejection was observed from near centre disc following the M1.2 flare from AR4028 at 21/1558 UTC, with an expected arrival at Earth during the first half of 23 Mar, not other Earth-directed coronal mass ejections were observed.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of two to three CME enhancements. Speeds rose from slightly elevated to elevated, peaking around 21/2200UTC, then fell back to slightly elevated to end the period. Interplanetary Magnetic Field was initially moderate but became strong, peaking very strong at 21/2100UTC, then fell back to Moderate. The north-south component, Bz, followed a similar pattern, becoming strongly variable before gradually easing. Geomagnetic activity started weak, with mostly G1/Minor Geomagnetic storms overnight, and a single G2/Moderate storm period at 22/0000-0300UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Low activity is expected, with a chance of further isolated M-class flares.

Solar Wind / Geomagnetic Activity: Two coronal mass ejections feature in the forecast, with a chance of further weak transients. One coronal mass ejection from 19 Mar may give a glancing blow at Earth late on day 1 (22 Mar). The second was a faint halo coronal mass ejection which is likely to arrive during the the first half of day 2 (23 Mar).

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Otherwise, solar winds are expected to continue slightly enhanced initially, a coronal hole high speed stream is expected to arrive during the first half of day 2 (23 Mar), bringing Enhanced solar winds. Solar winds will then gradually decline through days 3 and 4, back to background before the potential arrival of the high speed stream from another coronal hole from late day 4.

Quiet to Active geomagnetic conditions are likely initially, before rising to G1/Minor to G3/Strong Geomagnetic storming in relation to the likely combined high speed stream and coronal mass ejection influence from late day 1 (22 Mar), through day 2 (23 Mar), with a greater risk of this expected day 2. Geomagnetic activity is then expected to reduce back to Unsettled to Active, with a chance of G1-G2/Minor to Moderate Geomagnetic Storms days 3 and 4 (Mar 24 & 25) from residual coronal mass ejection effects, then the coronal hole high speed stream.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background levels, with a slight chance of enhancement from any larger flares.

Geomagnetic Storms

Geomagnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	Yes	60	90	50	40
Strong	G3	No	20	50	5	5
Severe	G4	No	5	20	1	1
Extreme	G5	No	1	2	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	Yes	35	35	35	35
Very Active	R3-R5 (X Class)	No	1	1	1	1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.

Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 370 900 0100 Email: enquiries@metoffice.gov.uk

© Crown Copyright 2025. All Rights Reserved.